*** ABSTRACT ONLY ***

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Investigation of Exposure Protection Using Class A Foams

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ABSTRACT

An exposure-protection study sponsored by the United States Fire Administration was conducted at the National Institute of Standards and Technology's Building and Fire Research Laboratory using water and four Class A firefighting agents. The Class A agents are surfactants, which reduce the surface tension of water. The study had two objectives: the first was to determine how effective the agents were, relative to water, at remaining on or in exterior siding materials; the second was to determine if the additional mass of water remaining on or in the material, afforded by the agents, significantly increased the time to ignition.

The exposure-protection experiments comprised mass-retention and ignition-inhibition experiments. For the mass-retention experiments, water and the four agents were applied to three common exterior siding materials: unstained plywood, stained plywood, and vinyl. Water was applied as a spray, and the agents were applied as sprayed solution or compressed-air foam (CAF). The mass of the agent that remained on or in the siding, the ambient temperature, and relative humidity were measured over a six-hour period, and the mass-retention of the agents was compared to the mass retention of water-sprayed panels. The results of the mass-retention experiments were used for the ignition-inhibition experiments, to determine the initial mass/unit-area of an agent to apply to laboratory-scale samples of the plywood. The time to ignition of the samples was measured using a cone calorimeter. The time to ignition of the agent-treated samples was compared to the time to ignition of dry and water-treated samples.

The agents, both as solution and as CAF, were more effective than plain water at remaining on or in the plywood but less effective than plain water on the vinyl. The mass-retention effectiveness resulted in increased times to ignition of agent-treated samples compared with dry and water-treated samples. The penetrating/wetting ability of the agents may be the characteristic which most affects the increase in time to ignition.